

WHAT IS CLAIMED IS:

1. A cosite interference rejection system comprising:

an interference subsystem coupled to a transmit system, the interference subsystem weighting a sampled transmit signal based on a feedback signal such that the weighted signal is out of phase with the sampled transmit signal;

an optical cancellation subsystem coupled to the interference subsystem and a receive antenna, the optical cancellation subsystem converting an optical signal into a desired receive signal based on an interfering coupled signal and the weighted signal;
and

a feedback loop for providing the feedback signal to the interference subsystem based on the desired receive signal.

2. The rejection system of claim 1 wherein the optical cancellation subsystem includes:

- an optical source for generating the optical signal;
- a modulation network coupled to the optical source, the receive antenna, and the interference subsystem, the modulation network phase modulating the optical signal based on the interfering coupled signal and the weighted signal; and
- a demodulation system coupled to the modulation network and the feedback loop, the demodulation system demodulating the phase modulated optical signal.

3. The rejection system of claim 2 wherein the modulation network includes:

- a first modulator coupled to the optical source and the receive antenna, the first modulator phase modulating the optical signal based on the interfering coupled signal;
- a second modulator coupled to the interference subsystem, the second modulator phase modulating the optical signal based on the weighted signal; and
- a fiber optic subsystem for transferring the optical signal from the first modulator to the second modulator.

4. The rejection system of claim 3 wherein the first modulator is remotely located from the second modulator.

5. The rejection system of claim 4 wherein the rejection system is fixed to an aircraft, the first modulator and the second modulator being position to obtain a desired weight distribution within the aircraft.

6. The rejection system of claim 2 wherein the optical source is a laser.

7. The rejection system of claim 1 wherein power transmitted by the transmit system is coupled to the receive antenna.

8. The rejection system of claim 1 wherein the interference subsystem includes:

an amplifier for amplifying the sampled transmit signal; and

an amplitude and phase module for weighting the sampled transmit signal.

9. The rejection system of claim 1 wherein the feedback loop includes a coupler for sampling the desired receive signal.

10. The rejection system of claim 1 further including a low noise amplifier for amplifying the desired receive signal.

11. An optical cancellation subsystem for a cosite interference rejection system, the optical cancellation subsystem comprising:

an optical source for generating an optical signal;

a modulation network coupled to the optical source, a receive antenna, and an interference subsystem, the modulation network phase modulating the optical signal based on an interfering coupled signal from the receive antenna and a weighted signal from the interference subsystem; and

a demodulation system coupled to the modulation network, the demodulation system demodulating the phase modulated optical signal to generate a desired receive signal.

12. The cancellation subsystem of claim 11 wherein the modulation network includes:

a first modulator coupled to the optical source and the receive antenna, the first modulator phase modulating the optical signal based on the interfering coupled signal;

a second modulator coupled to the interference subsystem, the second modulator phase modulating the optical signal based on the weighted signal; and

a fiber optic subsystem for transferring the optical signal from the first modulator to the second modulator.

13. The cancellation subsystem of claim 12 wherein the first modulator is remotely located from the second modulator.

14. The cancellation subsystem of claim 13 wherein the cancellation subsystem is fixed to an aircraft, the first modulator and the second modulator being positioned to obtain a desired weight distribution within the aircraft.

15. The cancellation subsystem of claim 10 wherein the optical source is a laser.

16. A method for rejecting cosite interference, the method comprising the steps of:

weighting a sampled transmit signal based on a feedback signal such that the weighted signal is out of phase with the sampled transmit signal;

converting an optical signal into a desired receive signal based on an interfering coupled signal and the weighted signal; and

generating the feedback signal based on the desired receive signal.

17. The method of claim 16 further including the steps of:
generating the optical signal;
phase modulating the optical signal based on the interfering coupled signal and
the weighted signal; and
demodulating the phase modulated optical signal.

18. The method of claim 17 further including the steps of:
phase modulating the optical signal with a first phase modulator based on the
interfering coupled signal;
transferring the optical signal to a second phase modulator with a fiber optic
subsystem; and
phase modulating the optical signal with the second phase modulator based on
the weighted signal.

19. The method of claim 18 further including the step of generating the optical
signal with a single wavelength laser.